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## (54) Coin-operated gaming machine

(57) A coin-operated gaming machine which offers the prospect of a win, including a plurality of rotatable members (2, 3, 4), which are provided with symbols which determine a win or a loss and are associated with display windows (5), and a microcomputer (25), fitted with a random generator, for controlling the entire course of the game. A rotatable disc (15) is provided, which is marked with different winning panels (16), is provided with an arrow (19) which is oppositely rotatable about the disc (15), the disc (15) and the arrow (19) having the same number of positions, and upon the occurrence of a predetermined combination of symbols in the display windows (5), the disc (15) and the arrow (19) rotate, and are arrestable virtually simultaneously by the operation of a stop button (24), and then the win, marked on the disc (15) by the arrow (19) is awarded.

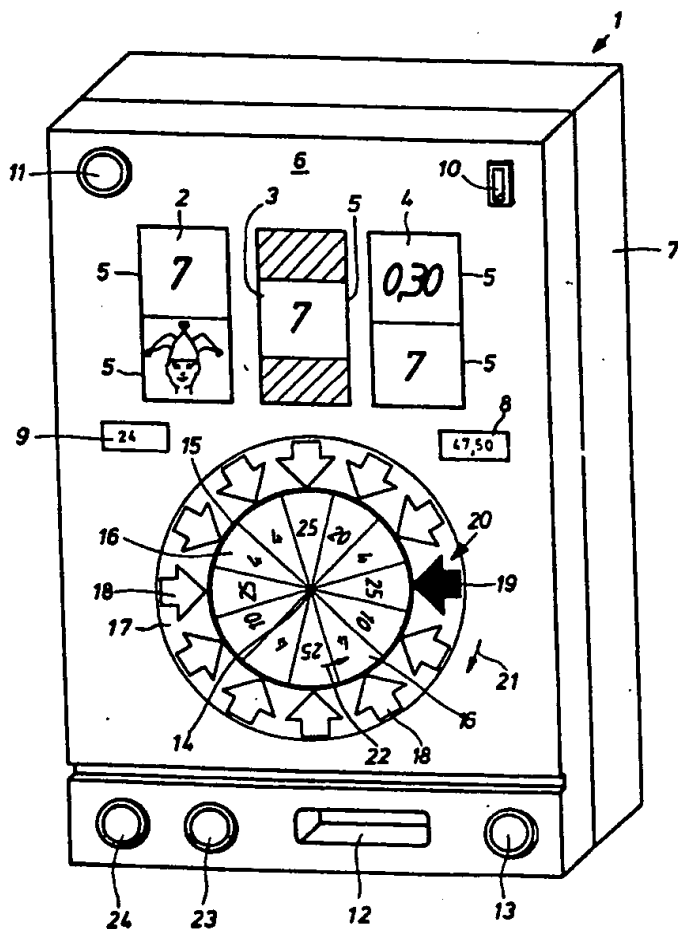


Fig. 1

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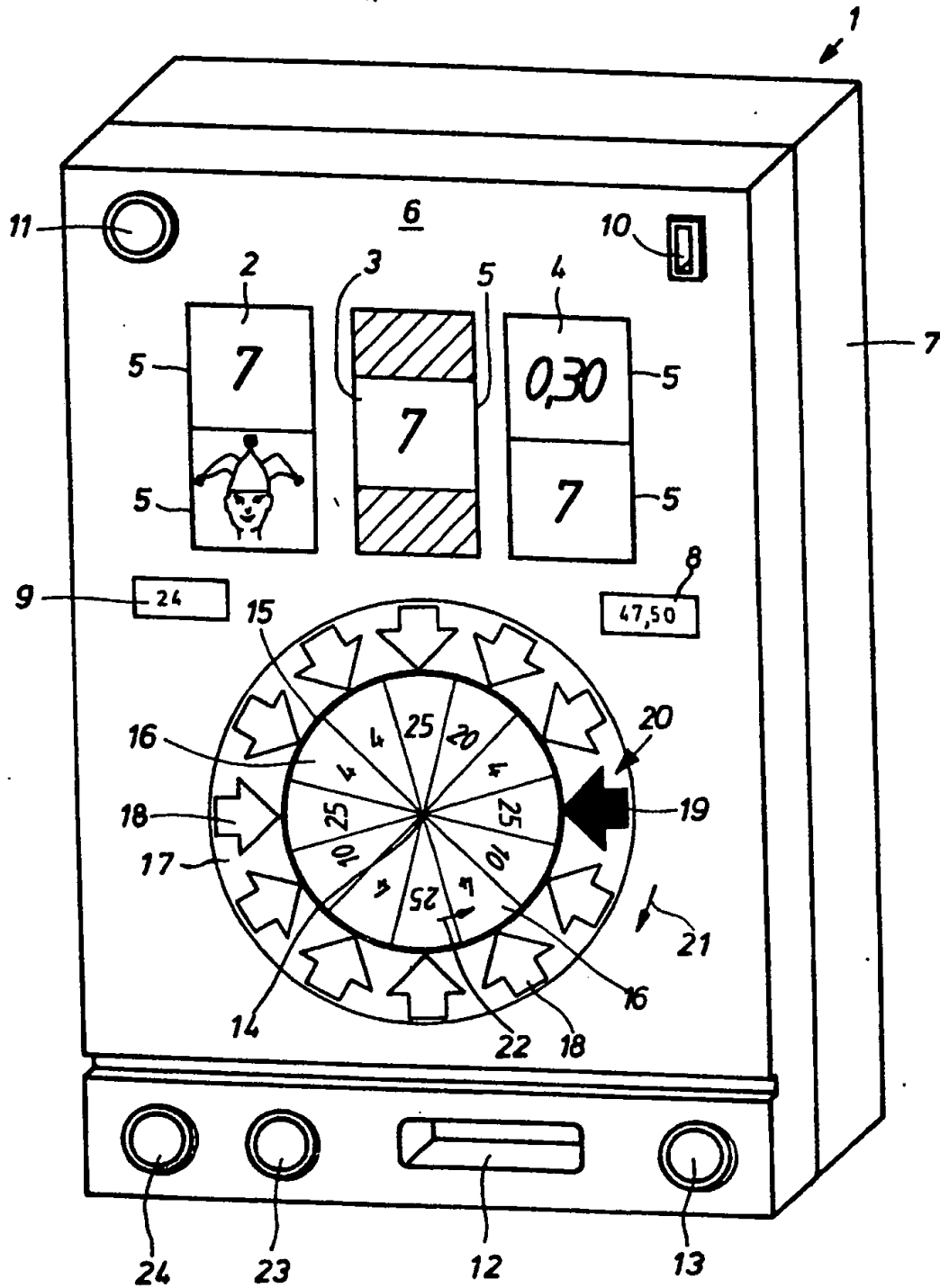


Fig. 1

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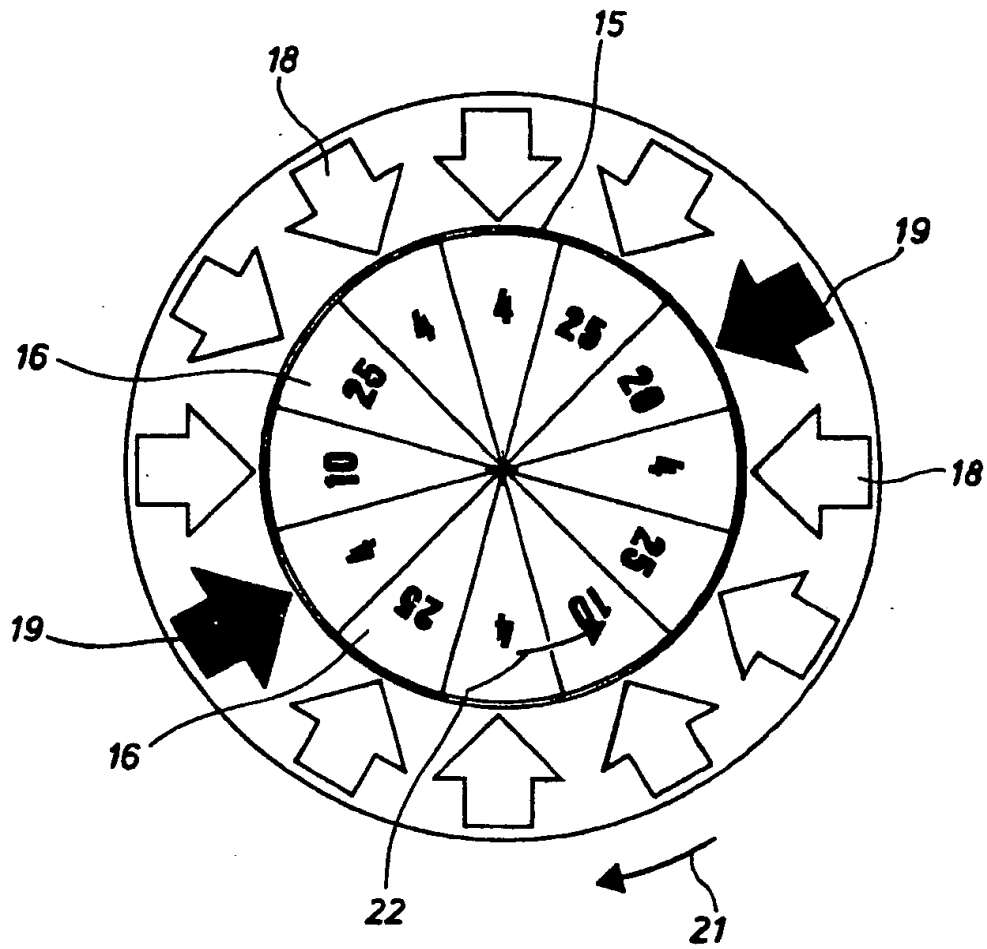


Fig. 2

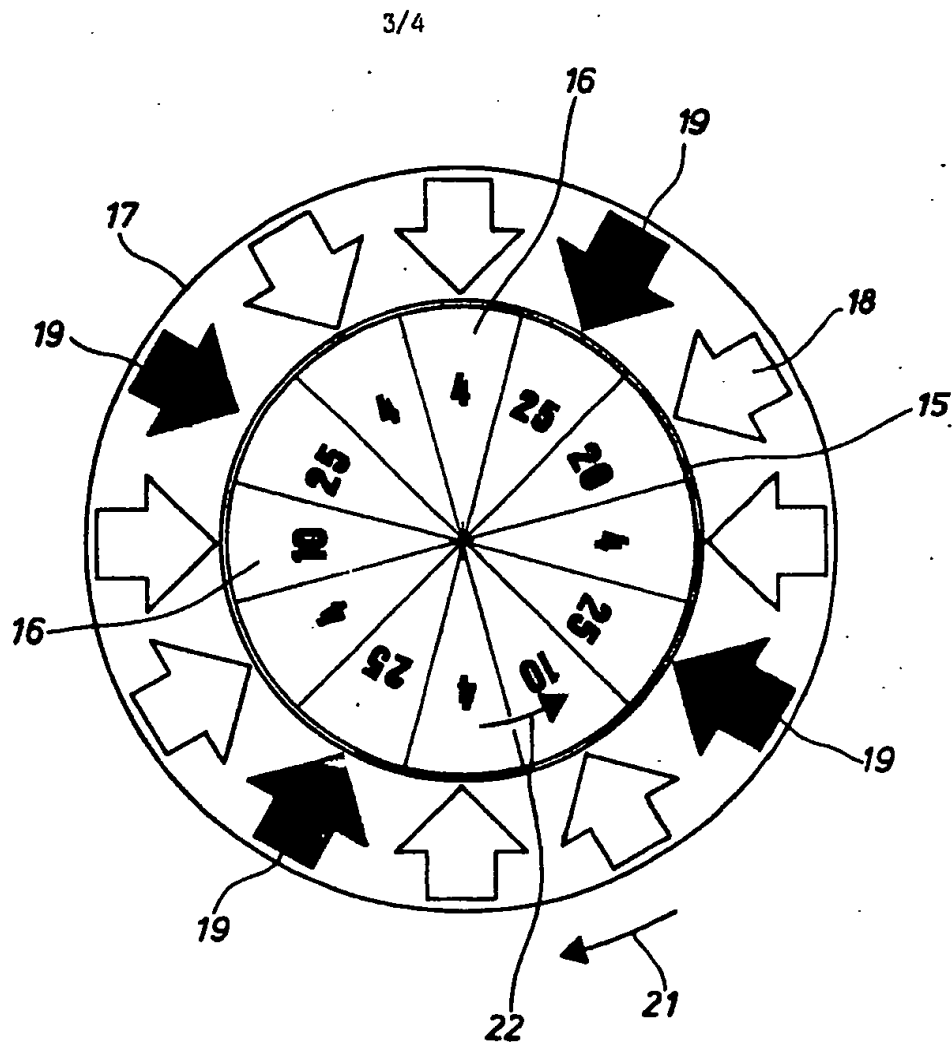


Fig. 3

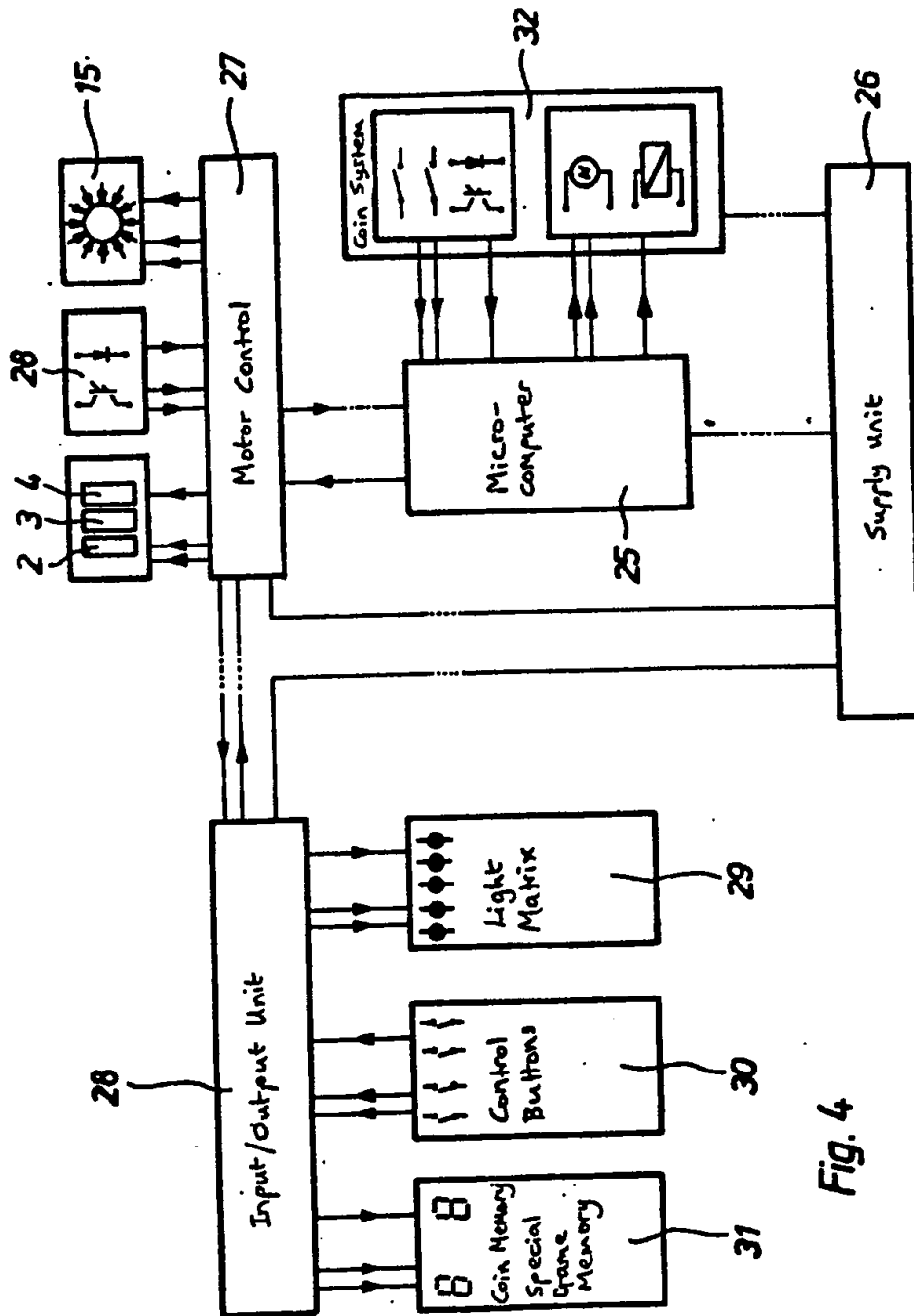


Fig. 4

COIN OPERATED GAMING MACHINE

5           The present invention relates to a coin-operated  
gaming machine which offers the prospect of a win, including  
a plurality of rotatable members which are provided with  
symbols which determine a win or a loss and are associated  
with display windows, and a microcomputer, fitted with a  
10 random generator, for controlling the entire course of  
a game.

          A wide variety of such coin-operated gaming machines  
are known. They mainly have three rotatable members which  
15 may be in the form of rollers or in the form of discs.  
The rotatable members have winning symbols on their surface  
which can be perused through display windows from outside.  
The rotatable members are generally stopped in succession  
and, after all of the members have stopped, the combination  
20 of symbols appearing in the display windows determines a  
win or a loss. This is apparent from a winning diagram  
provided on the front panel of the gaming machine.  
Specific combinations of symbols give rise to a plurality  
of so-called special or extra games. To increase the chances  
25 of winning, these special games are games where higher  
pay-outs are expected in the event of a win.

          Various measures have already been taken to induce  
a player to use such gaming machines, to entertain him  
30 also during the course of the game and to provide him with  
inducements to continue playing. Many of these gaming  
machines are provided with control means for the player to  
use, e.g. buttons, levers and knobs. These operating means  
generally affect the movement of the individual rotatable  
members. In consequence, the player is placed in a position  
35 where he can start one or a plurality of the rotatable

members by operating such an operating means, e.g. a starting button, whereby the player is given the opportunity of actually influencing the events of the game. Stop buttons are also provided to enable the player to hold a rotatable member thereby giving the player the impression that he can influence the events of the game and, hence, the combination of symbols which result during the game.

Further inducements to play are provided by panels having win-indicating means which are accordingly illuminated upon the achievement of a predetermined win. To achieve a greater win, more especially with the special games, it is necessary to play numerous games. In order to make the game more varied, means for introducing risks in the game have been developed which permit the player to increase the already attained win at the risk of losing. In addition, gaming machines are known which permit the attainable win to be increased without the player suffering any losses.

With modern gaming machines which are on the market today, the entire course of the game - including determining the win and paying-out the win - is electronically controlled by means of a microcomputer which contains a program corresponding to the particular course of the game. A so-called random generator is associated with the microcomputer in order to exclude any mathematical interrelationship in determining wins of subsequent games, so that each result of a game is dependent on chance. At the very outset of the rotational movement of the individual rotatable members, the random generator actually determines the symbol which forms a part of the regulatable combination of symbols and stops the rotary component when this randomly determined symbol is in the result position. The control buttons are also linked to the microcomputer and, by operating the control buttons,

the player is able to influence the course of the game as he wants, so that the rotary components can be restarted or prematurely arrested in known manner in order to give the player the customary entertainment value.

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With a gaming machine of the above-described type, the invention seeks to make the course of the game and the possibilities of winning more varied and more exciting with greater inducements to play in order to increase the entertainment value for the player.

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According to the invention, there is provided a coin-operated gaming machine which offers the prospect of a win, comprising a plurality of rotatable symbol carrying members which are provided with symbols which determine a win or a loss and are associated with display windows, and a microcomputer, fitted with a random generator, for controlling the entire course of the game, wherein a rotatable disc which is marked with different winning panels is provided with an arrow which is oppositely rotatable around the disc, the disc and the arrow having the same number of positions, and wherein, upon the occurrence of a predetermined combination of symbols in the display windows, the disc and the arrow rotate and are stoppable virtually simultaneously by the operation of a stop button and then the win, indicated on the disc by the arrow, is awarded.

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Due to this arrangement of the gaming machine, the player can clearly see, when the disc is in its state of starting position - as is mainly the case - what additional wins he can achieve with the occurrence of a predetermined combination of symbols. If this combination of symbols now occurs the disc is set in rotation and, at the same time, the arrow begins to rotate in the opposite direction. In this case, the player can no longer see what win is in



what position. The player may then use the stop button to hold the arrow in any position he wants. The disc also stops when the arrow stops. The arrow now points to the attained winning panel of the disc, and the win marked  
5 in this winning panel is now given. Consequently, the excitement of the player is constantly increased by the subsequent events which may occur within a game during the interplay between the disc and arrow, with the result that the inducement to play is also increased.

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In one embodiment of the invention, the speed of rotation of the circular disc is greater than the speed of rotation of the arrow point to the disc. The relatively slow movement of the arrow permits the arrow to be stopped at  
15 the desired arrow panel by means of skill, while the relatively rapid movement of the disc permits a virtually simultaneous holding with the disc.

So that the player can achieve extra games with a chance of winning in excess of normal play, in addition to the legally prescribed maximum amount of money winnings, a further development of the gaming machine according to the invention provides that the winning panels of the disc, which are disposed adjacent one another in a  
20 sector-like manner, are selectively marked with wins in respect of special games or money. Consequently, the player has the chance of achieving special games or a money win by arresting the rotating arrow accordingly.

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So that the arrow rotates in a simple and wear-free manner from the point of view of design, according to an advantageous further development of the subject-matter of the invention, the disc is surrounded by illuminatable arrow panels which are associated with the individual  
30 winning panels of the disc, whereby, in order to simulate the rotating arrow- proceeding from an arrow panel which forms  
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a starting panel - the subsequent arrow panels are  
extinguishable in succession. In such a case, in order  
to increase the entertainment value, the starting panel  
for the rotational movement of the arrow is advantageously  
5 selectable from the arrow panels, as desired, by means of  
a button.

An additional, attractive arrangement of the gaming  
machine according to the invention is such that, in  
10 dependence on the occurrence of different combinations of  
symbols in the display windows, a variable number of arrows  
are illuminated in the arrow panels, such arrows  
simultaneously rotating in a direction opposite that of the  
rotating disc due to a step-wise sequence of extinguishing  
15 the following arrow panels and, after they and the disc  
have stopped, the arrows mark a corresponding number of  
winning panels on the disc, the wins indicated by the  
winning panels being allowable as the total winnings.  
Consequently, the more arrows the player obtains, the higher  
20 is his chance of achieving maximum winnings. The variable  
number of arrows supplied causes the player to pursue the  
course of events in the game with interest, and  
consequently the player is offered considerable entertainment  
value. With a predetermined combination of symbols, two opposed  
25 arrows are set in the arrow panels and, with another  
predetermined combination of symbols, four arrows which are  
disposed in a cross-like arrangement relative to one another  
are set in the arrow panels.

30 The invention will now be described further, by way  
of example, with reference to the accompanying drawings,  
in which: -

Fig. 1 is a perspective, front view of a gaming machine  
35 according to the invention;

Fig. 2 is an enlarged detailed view of the disc and its associated circle of arrows as illustrated in Fig. 1 but with two arrows set;

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Fig. 3 is an enlarged, detailed view of the disc and its associated circle of arrows as illustrated in Fig. 1, but with four arrows set; and

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Fig. 4 is a basic block diagram showing the circuit structure of the gaming machine of Fig. 1.

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The gaming machine 1 has three roller-like rotatable symbol carrying members 2, 3 and 4 which are each provided with a number of symbols for denoting a win or a loss. Only the particular portions of the rotatable members 2, 3 and 4 situated inside the display windows 5 in the front panel 6 of the housing 7 are visible. Two display windows 5, which are disposed one above the other, are associated with each of the two outer rotatable members 2 and 4, while the central rotatable member 3 is merely provided with one display window 5. After the members 2, 3 and 4 have stopped, the combination of symbols determining a loss or a win appears in the display windows 5. A coin indicator 8 and a special game indicator 9 are provided in the form of electronic displays below the three rotatable members 2, 3 and 4, and they indicate the amount of money in credit and the current number of special games. A coin slot 10 and a coin return button 11 are disposed above the windows 5. A pay-out tray 12 and a control button 13, which is used to influence - i.e. restart and stop - the individual rotatable members 2, 3 and 4, are provided in the lower region of the gaming machine 1.

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In addition, a circular disc 15, which is rotatable about an axis 14, is disposed in the front panel 6 between the members 2, 3 and 4 and the pay-out tray 12. The visible

front surface of the disc 15 is divided into sector-like winning panels 16 which are disposed directly adjacent one another. The individual winning panels 16 are marked with the number of special games which can be achieved-  
5 four, ten, twenty or twenty-five, respectively. Naturally, the winning panels 16 may also be marked with money winnings up to the maximum legally permissible limit. A circle of arrows 17, formed from illuminatable arrow panels 18,  
10 surrounds the disc 15. Each arrow panel 18, which points to the disc 15, is centrally associated with a predetermined winning panel 16, i.e. the number of arrow panels 18 corresponds to the number of winning panels 16. To simulate an arrow 19 rotating around the disc 15, an arrow panel 18, which  
15 serves as the start panel 20, is extinguished, and subsequently the following arrow panels 18 are extinguished in a stepwise manner in the direction of arrow 21; the disc 15 is simultaneously rotating in the direction of arrow 22. The start panel 20 of arrow 19 may be freely selected by  
20 means of a button 23 situated next to the pay-out tray 12. By utilising a stop button 24 which is provided next to the button 23, it is possible to hold the rotating arrow 19 within the circle of arrows 17 in a desired arrow panel 18, with the result that the disc 15 stops rotating  
25 at the same time.

If three identical DM symbols appear next to one another in the display windows 5 - one of these symbols being shown in the upper display window 5 of the left-hand  
30 member 4 in Fig. 1 - the DM amount associated with these symbols is won and is indicated in the coin indicator 8. If, however, a combination of three identical special symbols of a first type appears in the display windows 5, special games may also be won in addition to a sum of money,  
35 and such games are indicated in the special game indicator 9. Special games offer the player a greater expectation of winning, while predetermined symbols on the central member

actually produce a win of 3 DM automatically. If a predetermined combination of special symbols of a second type appear on the members 2, 3 and 4 - such as three figure 7's next to one another, for example - the arrow 19 in the starting panel 20 is set in the circle of arrows 17. The player may then shift the starting panel 20 of the arrow 19 within the circle of arrows 18 for a certain period of time. Subsequently, the disc 15 is set in rotation in the direction of arrow 22, and the arrow 19 is set in rotation in the direction of arrow 21, the speed of rotation of the disc 15 being greater than the speed of rotation of the arrow 19. By means of the stop button 24, the player may now hold the arrow 19, which rotates from arrow panel to arrow panel, through extinction, on any arrow panel 18 he may want, and consequently the disc 15 is stopped at the same time. The arrow 19 now points to a predetermined winning panel 16 of the disc 15, and the special games indicated there are now won.

Upon the appearance of four special symbols of the second type in the display windows 5, i.e. upon the appearance of four figure 7's in the display windows 5, two opposed arrows 19 are set in the circle of arrows 17, as illustrated in Fig. 2. The two arrows 19 rotate simultaneously in a direction opposite that of the rotating disc within the circle of arrows 17. After the arrows 19 and the disc 15 have stopped, the arrows 19 point to two winning panels 16 of the disc 15, and the special games indicated there are added together and consequently allowed as the total winnings.

In the illustration of the disc 15 and its associated circle of arrows 17, as shown in Fig. 3, an arrow arrangement comprising four arrows 19, which are disposed in a cross-like arrangement relative to one another, is set in the circle of arrows 17. The four arrows 19 are then given when, after

the rotatable member 2, 3 and 4 have stopped, five special symbols of the second type appear in the display windows 5, i.e. in the present case, the figure 7 can be seen five times in the display windows 5. After the four arrows 19 in the circle of arrows 17 have finished rotating, and after the disc 15 has stopped, the four arrows 19 point to four associated winning panels 16 of the disc 15. The number of special games shown on these four winning panels 16 is added-up and indicated to the player as total winnings. Consequently, with four sets of arrows 19 the player can achieve the maximum number of special games offered by the disc 15.

The gaming machine 1 is controlled entirely by means of a microcomputer 25. All of the inputs and outputs, such as pulses in respect of coins, rotatable member monitoring, disc monitoring and buttons, or information regarding the motor for the rotatable members the disc motor, the lights, the indicators and the pay-out motor, are serially transmitted in order to minimise the number of signal lines. All of the lights are controlled from a multiplexed light matrix, and the displays are also multiplexed. In particular, the microcomputer 25 is responsible for randomly determining the stopping of the rotatable members 2, 3 and 4 and for determining the result in the additional winning game (15, 19), and the microcomputer 25 indicates to the player how the course of his game should proceed by the use of light and sound effects.

The supply unit 26 is responsible for supplying the power to the entire gaming machine 1. The required voltages are derived from a mains transformer, rectified and made available to the various assemblies. The microcomputer 25 includes a writing and reading memory (RAM) as the working memory, a permanent memory (ROM) as the program memory with an integrated random generator, and additional, necessary components such as, for example, buffers, cycle

generators, recorders and the like. In addition, the microcomputer 25 includes a sound generator together with its associated AF amplifier. The motor control 27 supplies the signals necessary for the stepping motors of the rotatable members 2, 3 and 4 - such signals being controlled by the microcomputer 25 - and indicates to the microcomputer 25 the synchronisation signal from the members 2, 3 and 4, such signals being received by a unit 28 for detecting and amplifying signals. Furthermore, the motor control 27 is actively connected to the stepping motor of the disc 15. An input and output unit 28 forms the point of intersection for a multiplexed light matrix 29 which actuates all of the lights of the gaming machine 1, even those of the arrow panels 18 of the circle of arrows 17. The control buttons 30 and all of the indicators 31 are actuated by the microcomputer 25, or respectively their signals are supplied to the microcomputer 25. Moreover, an assembly 32, which constitutes the complete coin system of the gaming machine 1, is connected to the microcomputer 25. The assembly 32 serves to adapt the coin pulses to the reprocessing electronics to detect the number of coins which have been inserted and still exist in the coin memory, and the assembly 32 also supplies the control pulses for the money paying out motors.

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The features of the invention, as disclosed in the above description, in the drawings and in the claims, both individually and in any combination, may be materially intrinsic for the realisation of the invention in its various embodiments.

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CLAIMS

1. A coin-operated gaming machine which offers the prospect of a win, comprising a plurality of rotatable symbol carrying members, which are provided with symbols which determine a win or a loss and are associated with display windows, and a microcomputer, fitted with a random generator, for controlling the entire course of the game, wherein a rotatable disc, which is marked with different winning panels, is provided with an arrow which is oppositely rotatable around the disc, the disc and the arrow having the same number of positions, and wherein, upon the occurrence of a predetermined combination of symbols in the display windows, the disc and the arrow rotate and are stoppable virtually simultaneously by the operation of a stop button and then the win, indicated on the disc by the arrow, is awarded.
2. A gaming machine as claimed in claim 1, wherein the speed of rotation of the circular disc is greater than the speed of rotation of the arrow pointing to the disc.
3. A gaming machine as claimed in claims 1 and 2, wherein the winning panels of the disc, which are disposed adjacent one another in a sector-like manner, are selectively marked with wins in respect of extra games or money.
4. A gaming machine as claimed in claims 1 to 3, wherein the disc is surrounded by illuminatable arrow panels which are associated with the individual winning panels of the disc, and wherein, in order to simulate a rotating arrow, proceeding from an arrow panel, which forms a start panel, the subsequent arrow panels are illuminatable and extinguishable in succession.



5. A gaming machine as claimed in claims 1 to 4, wherein the starting panel for the rotational movement of the arrow is selectable, as desired, from the arrow panels by means of a button.

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6. A gaming machine as claimed in claims 1 to 5, wherein, in dependence on the occurrence of different combinations of symbols in the display windows, a variable number of arrows are illuminated in the arrow panels, such arrows simultaneously rotating in a direction opposite that of the rotating disc due to a step-wise sequence of illuminating and extinguishing the subsequent arrow panels and, after they and the disc have stopped, the arrows mark a corresponding number of winning panels on the disc, the wins indicated by the winning panels being awarded as the total winnings.

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7. A gaming machine as claimed in claim 6, wherein, with a predetermined combination of symbols, two opposed arrows are set in the arrow panels.

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8. A gaming machine as claimed in claim 6, wherein, with a predetermined combination of symbols, four arrows which are disposed in a cross-like arrangement relative to one another are set in the arrow panels.

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9. A coin-operated gaming machine substantially as hereinbefore described with reference to the accompanying drawings.

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